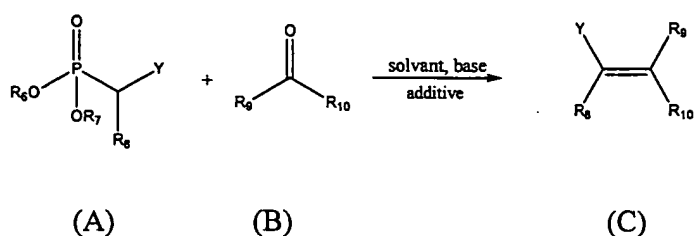


Claims

- 1- A process for the diastereoselective preparation of olefins (C) via the Horner-
 5 Wadsworth-Emmons reaction, which consists in reacting at low temperature a
 phosphonate (A) with a carbonyl derivative (B) in the presence of a base, in a suitable
 solvent,



- 10 in which the compounds (A) (B) and (C) are such that:

Y represents an electron-withdrawing group chosen from:

- CO₂R,
 -CN,
 -C(O)R,
 15 -S(O)R,
 -S(O)₂R,
 -C(O)NRR',
 -N=CRR',
 -P(O)OROR',

- 20 with R and R' as defined below,

R₆ and R₇, taken independently, may be identical or different and represent:

- a saturated or unsaturated, linear or branched aliphatic radical containing from 1 to 24 carbon atoms, optionally substituted with hetero atoms;
- a saturated, unsaturated or aromatic, monocyclic or polycyclic cycloaliphatic radical containing from 4 to 24 carbon atoms, optionally substituted with
- 25 hetero atoms;
- a saturated or unsaturated, linear or branched aliphatic radical bearing a cyclic substituent optionally substituted with hetero atoms in the aliphatic part and/or the cyclic part;

- 30 R₁₀, R and R', taken independently, may be identical or different and represent:

- a hydrogen atom;
- a saturated or unsaturated, linear or branched aliphatic radical containing from 1 to 24 carbon atoms, optionally substituted with hetero atoms;
- a saturated, unsaturated or aromatic, monocyclic or polycyclic cycloaliphatic radical containing from 4 to 24 carbon atoms, optionally substituted with hetero atoms;
- a saturated or unsaturated, linear or branched aliphatic radical bearing a cyclic substituent optionally substituted with hetero atoms in the aliphatic part and/or the cyclic part;

10

R₆, R₇, R and R' may also be taken together to form a saturated, unsaturated or aromatic ring optionally comprising hetero atoms;

R₈ represents a radical chosen from:

- R,
- a halogen atom,
- OR,
- NRR',
- with R and R' as defined above,

15

R₉ represents a radical chosen from:

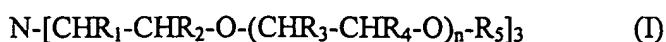
- a saturated or unsaturated, linear or branched aliphatic radical containing from 1 to 24 carbon atoms, optionally substituted with hetero atoms;
- a saturated, unsaturated or aromatic, monocyclic or polycyclic cycloaliphatic radical containing from 4 to 24 carbon atoms, optionally substituted with hetero atoms; the hetero atoms also possibly being present in the cyclic part;
- a saturated or unsaturated, linear or branched aliphatic radical bearing a cyclic substituent optionally substituted with hetero atoms in the aliphatic part and/or the cyclic part;

25

with the condition that R₉ takes precedence over R₁₀ according to the Cahn Ingold and Prelog rules,

30

characterized in that a tris(polyoxaalkyl)amine sequestering agent of formula (I):



in which:

n is an integer between 0 and 10;

R₁, R₂, R₃ and R₄ may be identical or different and represent a hydrogen atom or an
5 alkyl radical containing from 1 to 4 carbon atoms;

R₅ represents a hydrogen atom, an alkyl or cycloalkyl radical containing up to 12
carbon atoms, a phenyl radical or a radical of formula $-C_mH_{2m}-\Phi$, or $C_mH_{2m+1}-\Phi-$,
with m being an integer between 1 and 12 and Φ being a phenyl radical;

10 is added to the reaction medium in an amount that is effective to increase the diastereo-
selectivity of the olefins (C).

2- The process as claimed in claim 1, characterized in that the tris(polyoxaalkyl)amine
sequestering agent is chosen from the tris(polyoxaalkyl)amines of formula (I) in
15 which:

R₁, R₂, R₃ and R₄ may be identical or different and represent a hydrogen atom or a
methyl radical;

n is an integer between 0 and 3; and

R₅ represents a hydrogen atom or an alkyl radical containing from 1 to 4 carbon atoms.
20

3- The process as claimed in claim 2, characterized in that the tris(polyoxaalkyl)amine
sequestering agent is the tris(polyoxaalkyl)amine of formula (I) in which:

R₁, R₂, R₃ and R₄ represent a hydrogen atom;

n is 1; and

25 R₅ represents a methyl radical.

4- The process as claimed in any one of claims 1 to 3, characterized in that the amount
of tris(oxaalkyl)amine sequestering agent of formula (I) used is between 0.05 and 10
equivalents per 1 equivalent of phosphonate, one equivalent of aldehyde and one
30 equivalent of base.

5- The process as claimed in any one of claims 1 to 4, characterized in that the amount
of tris(oxaalkyl)amine sequestering agent of formula (I) used is 1 equivalent of tris-

(oxaalkyl)amine sequestering agent of formula (I) per 1 equivalent of phosphonate, one equivalent of aldehyde and one equivalent of base, the whole being dissolved in the solvent.

- 5 6- The process as claimed in any one of claims 1 to 5, characterized in that the phosphonate used for the reaction is chosen from the phosphonates of formula (A) in which:

Y represents CO_2R , with R representing a hydrogen atom or a linear, branched or cyclic, saturated or unsaturated alkyl radical alkyl containing from 1 to 12 carbon atoms,

- 10 R_6 and R_7 represent a $-\text{CH}_2\text{CF}_3$ radical, and
 R_8 represents a hydrogen atom.

- 7- The process as claimed in any one of claims 1 to 6, characterized in that the phosphonate used for the reaction is chosen from the phosphonates of formula (A), in
 15 which:

Y represents CO_2R , with R representing a methyl radical,

R_6 and R_7 represent a $-\text{CH}_2\text{CF}_3$ radical, and
 R_8 represents a hydrogen atom.

- 20 8- The process as claimed in any one of claims 1 to 7, characterized in that the carbonyl derivative used for the reaction is preferably chosen from aldehydes, i.e. R_{10} represents a hydrogen atom.

- 9- The process as claimed in claim 8, characterized in that the aldehyde used is such that
 25 R_9 is an aliphatic radical and optionally comprises ethylenic unsaturations.

10- The process as claimed in claim 9, characterized in that the radical R_9 is cyclohexyl.

- 11- The process as claimed in claim 8, characterized in that the radical R_9 used is
 30 aromatic and optionally comprises one or more substitutions with alkoxy groups containing from 1 to 6 carbon atoms, or halogen atoms or CF_3 groups.

12- The process as claimed in claim 11, characterized in that the radical R_9 is a phenyl radical.

13- The process as claimed in any one of claims 1 to 12, characterized in that the base
5 used is chosen from:

- amides of the type $MNR''R'''$ with M being an alkali metal such as lithium, sodium or potassium, and R'' , R''' being chosen from alkyl radicals or radicals of alkylsilane type,
- alkoxides of the type MOR'' with M being an alkali metal such as lithium, sodium or potassium, and R'' being chosen from alkyl radicals,
- 10 - hydrides of the type MH with M being an alkali metal such as lithium, sodium or potassium,
- carbonates of the type M_2CO_3 , with M being an alkali metal such as lithium, sodium, potassium or cesium, or an alkaline-earth metal such as calcium or barium,
- alkali metal or alkaline-earth metal hydroxides such as $LiOH$, $NaOH$, KOH , $CsOH$,
- 15 $Mg(OH)_2$, $Ca(OH)_2$ and $Ba(OH)_2$, or
- organic bases, for instance 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU), 1,1,3,3-tetramethylguanidine (TMG) or 1,4-diazabicyclo[2.2.2]octane (DABCO) in combination with alkali metal or alkaline-earth metal halides.

14- The process as claimed in claim 13, characterized in that the base used is chosen
20 from the potassium salt of hexamethyldisilazane (KHMDs) and potassium tert-butoxide ($KOtBu$).

15- The process as claimed in any one of claims 1 to 14, characterized in that the
25 solvent used is a polar solvent.

16- The process as claimed in claim 15, characterized in that the solvent used is chosen from ether solvents.

17- The process as claimed in claim 16, characterized in that the solvent used is chosen
30 from tetrahydrofuran (THF) and methyl tert-butyl ether (MTBE).

- 18- The process as claimed in any one of claims 15 to 17, characterized in that the amount of solvent used is between 0.1 and 20 ml per mmol of phosphonate (A).
- 19- The process as claimed in any one of claims 1 to 18, characterized in that the
5 temperature is maintained at a temperature of less than or equal to 0°C.
- 20- The process as claimed in any one of claims 1 to 19, characterized in that the temperature is maintained at a temperature of less than or equal to -20°C.
- 10 21- The process as claimed in claim 20, characterized in that the temperature is maintained at a temperature of less than or equal to -50°C.